

GEORGIA INSTITUTE OF TECHNOLOGY

OFFICE OF RESEARCH ADMINISTRATION

RESEARCH PROJECT INITIATION

Date: September 25, 1974

Project Title: Traffic-Signal Workshop Series

Project No: E-20-529

Principal Investigator Dr. Peter S. Parsonson

Sponsor: Georgia Office of Highway Safety

Agreement Period: From 8/1/74 Until 7/31/75

Type Agreement: Contract: Project No. 613-75-004-001

Amount: \$14,000 OHS  
6,803 GIT (E-20-214)  
\$20,803 Total

Reports Required: Final Report

Sponsor Contact Person (s):

Mr. Carlton Fisher, Director  
Office of Highway Safety  
7 Hunter Street SW  
Atlanta, Georgia 30334  
656-3218

Assigned to: Civil Engineering

COPIES TO:

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GEORGIA INSTITUTE OF TECHNOLOGY  
OFFICE OF CONTRACT ADMINISTRATION  
RESEARCH PROJECT TERMINATION

Date: December 18, 1975

Project Title: **Traffic-Signal Workshop Series**

Project No: **E-20-529**

Principal Investigator: **Dr. Peter S. Parsonson**

Sponsor: **Georgia Office of Highway Safety**

Effective Termination Date: 7/31/75

Clearance of Accounting Charges: 7/31/75

Grant/Contract Closeout Actions Remaining:

Assigned to School of Civil Engineering

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Terminated Project File No. E 20 529

Other \_\_\_\_\_

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and title page? Imperfect volume copy?

B 396

E-20-629  
529

GEORGIA INSTITUTE OF TECHNOLOGY

ATLANTA, GEORGIA 30332

SCHOOL OF  
CIVIL ENGINEERING

TELEPHONE:  
(404) 894-2244

August 7, 1975

State Office of Highway Safety  
Seven Hunter Street, S.W.  
Atlanta, Georgia 30303

Attention: Mr. Peter M. Palmer, Highway Safety Planner

Final Report for Project 613-75-004-001,

"Traffic Signal Workshop Series,"

Georgia Tech Sponsored Instruction Project E20-529

Gentlemen:

As required by the contract for the subject project, transmitted herewith is evaluative material pertaining to the recently completed Traffic Signal Workshop Series of four short courses. As in past years, there is included for each workshop a roster of participants, an hour-by-hour course schedule with names of guest lecturers, and a general evaluation by the participants. Copies of letters of evaluation by your Mr. Palmer are also included.

A new feature this year was the use of two traffic-signal training films produced last year by Georgia Tech under a grant from the National Science Foundation. The films were shown in Workshop II and their effectiveness was evaluated by technical examinations administered to each participant. Sample examinations and the average class grades are reported.

Workshop I, "Introduction to Traffic Signalization," was presented on October 7-10, 1974, to 22 participants, of whom two were visitors from the local office of the FHWA. The purpose of this course was to teach in three days the background information needed by engineers and technicians alike. Dr. Parsonson was the Principal Instructor and was capably assisted by Senior Instructor Joseph M. Thomas Jr., and Instructor Bruce E. Friedman, both of Atlanta.

Workshop II, "Servicing of Electro-Mechanical Traffic-Signal Controllers," was presented on December 2-5, 1974, to 24 participants by Principal Instructor Richard McDonnell and Instructor Tom Countess, both of Alabama. Both of these instructors are able to relate very well to servicing personnel. The evaluations by the participants indicated that the course was well received.

Workshop III, "Traffic-Signal Operation at Local Intersections," was presented on March 10-13, 1975, to 20 participants, including an FHWA visitor. It was taught primarily by Dr. Parsonson, with assistance from Joe Thomas. This course has been uniformly successful over the years, and was well received again this year.

Workshop IV, "Traffic-Signal Operation in Coordinated Systems," was presented on May 26-30, 1975, to 19 participants, including one FHWA visitor. As in past years, a number of guest lecturers assisted the Principal Instructor, Dr. Parsonson. Again this year the participants experienced the most difficulty with this course, because of its advanced nature. By necessity, the course places considerable emphasis on digital systems, which are being installed in a number of cities in the state. It is a complex subject, beyond the grasp of the many of the novices who attend this series of short courses.

We feel that the Georgia series of Traffic Signal Workshops met its objectives once again this year. By mutual agreement with Mr. Palmer it has been decided not to extend the series beyond the four consecutive years it has served the state.

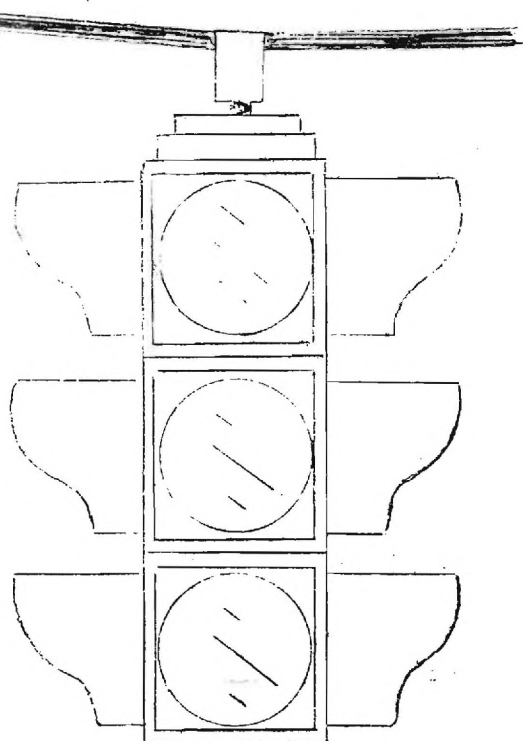
We look forward to continuing our relationship with your office in the years to come.

Yours very truly,

Peter S. Parsonson  
Associate Professor

pe  
cc: Office of Contract Administration  
Enclosure





THE DEPARTMENT OF CONTINUING EDUCATION OF THE  
GEORGIA INSTITUTE OF TECHNOLOGY

ANNOUNCES A SERIES OF  
TRAFFIC SIGNAL WORKSHOPS

TUITION-FREE  
AGAIN FOR  
1974-1975

COSPONSORED BY  
GEORGIA DIVISION, SOUTHERN SECTION  
INSTITUTE OF TRAFFIC ENGINEERS

CONDUCTED BY THE SCHOOL OF CIVIL ENGINEERING  
UNDER A TRAINING GRANT FROM THE STATE OFFICE OF  
HIGHWAY SAFETY, WHICH ADMINISTERS THE  
GEORGIA HIGHWAY SAFETY PROGRAM  
THROUGH FUNDS PROVIDED BY THE NATIONAL HIGHWAY  
TRAFFIC SAFETY ADMINISTRATION AND THE FEDERAL  
HIGHWAY ADMINISTRATION

Application Form  
GEORGIA TRAFFIC-SIGNAL WORKSHOP SERIES, 1974-75

Please Indicate the Desired Workshop:

- ☐ INTRODUCTION TO TRAFFIC SIGNALIZATION, September 30 - October 3, 1974
- ☐ SERVICING OF ELECTRO-MECHANICAL TRAFFIC-SIGNAL CONTROLLERS, December 2 - 5, 1974
- ☐ TRAFFIC-SIGNAL OPERATION AT LOCAL INTERSECTIONS, March 10 - 13, 1975
- ☐ TRAFFIC-SIGNAL OPERATION IN COORDINATED SYSTEMS, May 26 - 30, 1975

\*Full Legal Name \_\_\_\_\_  
Last Middle First \*Social Security Number

Position \_\_\_\_\_

Organization Name \_\_\_\_\_

Organization Address \_\_\_\_\_  
P.O. Box or Street City State

Zip Code \*County of Residence (if from Georgia) Organization Phone

\*Age Classification: 1. \_\_\_ under 22 3. \_\_\_ 36 - 55 \*Sex \_\_\_ Male  
2. \_\_\_ 22 - 35 4. \_\_\_ Over 55 \_\_\_ Female

Brief Description of Present Duties \_\_\_\_\_

Our agency wishes to enroll the above employee in the workshop(s) checked, and certifies that he is already working in or identified with the area of traffic control devices and will continue to do this type of work upon completion of this training. Our agency agrees to cooperate with Georgia Tech in the Sponsorship of these workshops by furnishing vouchers for each employee's salary, travel, meals and lodging in connection with his attendance, as explained in this brochure, and will allow an audit of costs shown on vouchers by authorized State or Federal personnel.

Signature and title of responsible agency official: \_\_\_\_\_

Signature Title Please Print Name

Mail Application to: Director  
Department of Continuing Education  
Georgia, Institute of Technology  
Atlanta, Georgia 30332  
Telephone: (404) 894-2400

☐ Check here if you plan to drive a car to the campus

\* Necessary for CEU records

## WORKSHOP SCHEDULE

Workshop I, "Introduction to Traffic Signalization", three days, September 30 - October 3, 1974;

Workshop II, "Servicing of Electro-Mechanical Traffic-Signal Controllers", three days, December 2 - 5, 1974;

Workshop III, "Traffic-Signal Operation at Local Intersections", three days, March 10 - 13, 1975;

Workshop IV, "Traffic-Signal Operation in Coordinated Systems, four days, May 26 - 30, 1975.

## ELIGIBILITY FOR ENROLLMENT

The workshops will be open only to employees of state and local governments of Georgia who are already working in or identified with the area of traffic control devices and who will continue to do this type of work upon completion of this training.

There are no other requirements for eligibility; the workshops are intended for traffic officers and traffic technicians as well as professional personnel.

## WORKSHOP OBJECTIVES AND SCOPE

The first workshop, "Introduction to Traffic Signalization", will cover in three days the background information needed by both engineers and technicians. It is an orientation course that should be taken by any newcomer to this field, no matter what his level or area of specialization. Those who are or who will become service technicians will go on to take "Servicing of Electro-Mechanical Traffic-Signal Controllers". While those who are engineers or timing technicians will chose to take "Traffic-Signal Operation at Local Intersections",

followed by "Traffic-Signal Operation in Coordinated Systems".

Detailed course outlines of the introductory course and the subsequent three workshops are included in this brochure.

"Servicing of Electro-Mechanical Traffic-Signal Controllers" is aimed at technicians desiring further training in the maintenance, troubleshooting, repair, and installation of electro-mechanical/electronic controllers. Solid-state equipment is not included. Equal attention will be given to pretimed and actuated equipment.

"Traffic-Signal Operation at Local Intersections" is intended for the engineer or technician who is interested in the proper selection of controller and in setting its timing functions so as to move traffic safely and efficiently. This workshop will focus on the choice of phasing for pretimed, semi-actuated, basic full-actuated and volume-density controllers at isolated intersections. Demand controllers and their long-loop presence detectors are also emphasized.

"Traffic - Signal Operation in Coordinated Systems" covers the various schemes for interconnecting a series of signalized intersections in order to minimize stops and delays. After a discussion of time-space diagrams and the coordination of pretimed controllers, attention will turn to the coordination of vehicle-actuated controllers. Emphasis will be placed on synchrolizers and the concept of the background cycle as the foundation for learning the operation of traffic-adjusted systems later in the course.

#### CLASSROOM FACILITIES

All four workshops will be held in Georgia Tech's new Traffic Signal Laboratory in the School of Civil Engineering. This facility is equipped with controllers, detectors, demonstration boards and audio-visual

equipment valued at over \$25,000. The circuitry of the controllers is representative of elector-mechanical/electronic, solid state, and modular designs; equipment from many manufacturers is included.

#### INSTRUCTIONAL METHOD

The introductory course will be limited to 30 participants and the other three to 20 participants each. These limitations are necessary because of the "workshop" nature of the courses and the emphasis on "hands on" familiarity with the equipment. Participants in each course spend many hours in workshop sessions with the same types of controllers and detectors as are used throughout the State. Lectures, demonstrations, written practice problems, field exercises and workshop sessions are woven together to produce maximum learning in the time available. Evenings are left free.

#### REGISTRATION

The workshops are offered free of charge. This has been made possible by a training grant from the State Office of Highway Safety. Under the training grant, the state and local agencies that send employees to the workshops will be considered co-sponsors of the project along with Georgia Tech. The expenses of these agencies for salary, travel, meals and lodging will therefore qualify as state or local project expenses and will generate Federal matching funds to cover the costs of the workshops. Instead of paying tuition, the agencies that send employees to the workshops need contribute to the project only by documenting their expenses for the employee's salary, travel, meals and lodging in connection with the courses.

## COURSE OUTLINES

### INTRODUCTION TO TRAFFIC SIGNALIZATION

- Purposes and General Features of Traffic Signals
- Required Phases and Sequences; Work Problem
- Operation of Pretimed Controllers; Phase Sequencing
- Workshop Session on Pretimed Controllers; Cam Breakout
- Signal Systems Advantages, General Features
- Coordination of Pretimed Controllers
- Detector Hardware and Installation
- Timing of Basic Actuated Controllers; Film
- Multi-Phase Actuated Controllers; Film
- Field Trips to Local Signalized Intersection
- Special Interval Units; Split Phasing
- Slides on the Uniform Manual
- Signal Display and Placement
- Coordination of Semi-Actuated Controllers
- Introduction to Traffic-Adjusted Systems
- Intersection Layout and Installation Planning
- Introduction to Troubleshooting and Bench Repair
- Basic Electric Circuitry; Test Equipment
- Maintenance and Repair of Pretimed Controllers
- Circuitry of E/M Actuated Controllers
- Maintenance and Repair of E/M Actuated Controllers
- Introduction to Solid State Equipment

### SERVICING OF ELECTRO-MECHANICAL TRAFFIC -SIGNAL CONTROLLERS

#### Pretimed Controllers - One-Half Day

- Review of Operation; Field Troubleshooting; Preventive Maintenance;  
Repair in Field and Shop

#### Actuated Controllers - One Day

- Two-Phase Controllers: Operation, Timing Circuits, Troubleshooting,  
Maintenance, Repair

- Multi-Phase Controllers: Operation, Circuitry, Troubleshooting,  
Maintenance, Repair

#### Accessory Equipment - One-Half Day

- Special Interval Units; Coordination Devices, Detectors

#### Installation - One Half Day

- Grounding, Bonding, Lightning Protection

- Georgia Specifications

- Field Equipment, Tools, Personnel

#### Troubleshooting - One-Half Day

- Periodic Inspections, Field and Shop

- Emergency Procedures: Priorities

- Recordkeeping

### TRAFFIC-SIGNAL OPERATION AT LOCAL INTERSECTIONS

- Timing of Pretimed Intervals; Work Problem
- Phase Capacity; Work Problem
- Location of Small-Area Detectors



- Advanced Actuated Controllers and their Detectors; Film
- Field Exercise-Manual Volume Counts Crossing Gap Measurement
- Multiple-Point Small-Area Detection
- Demand Controllers and Long-Loop Detectors
- Signal Warrants and Priority Ratings
- Case Studies; Specification Writing
- Advance Engineering Data
- Field Exercise--Measurement of Headways, Load Factors, Queue Discharge
- Economic Benefits of Intersection Improvements
- Preemption Control
- Field Exercise--Measurement of Vehicle Delay

#### TRAFFIC-SIGNAL OPERATION IN COORDINATED SYSTEMS

- Characteristics, Warrants and Design-Data Needs
- Time-Space Diagrams
- Coordination of Pretimed Controllers
- Principles of Coordination of Actuated Controllers
- Traffic-Adjusted Systems Using Only Volume
- Coordination of Full-Actuated Controllers
- Computer Aids to Time-Space Calculations
- Optically Limiting Signals
- Calculations for Network Coordination
- Traffic Parameters For Advanced Systems
- Advanced Traffic-Adjusted Analog Systems
- Communication-System Technology; Multiplexing
- Applications of Digital Computers
- Case Studies of Recent Centralized Systems
- Factors in the Selection of Advanced Systems
- Field Trips to an Arterial System and to Atlanta's  
Digital Computer for Traffic Control and Surveillance

#### FACULTY

All of the workshops are under the direction of Dr. Peter S. Parsonson, an Associate Professor in Georgia Tech's School of Civil Engineering. Dr. Parsonson has taught traffic engineering to university students and short course groups for several years and is a consultant to several cities and counties in Georgia.

Georgia Tech has retained two specialists in signal maintenance and repair to teach the course in servicing. Richard McDonnell, formerly president of Highway Traffic and Safety Corporation, Atlanta, will be the principal lecturer. Over the past 25 years, Mr. McDonnell has been employed by two major equipment manufacturers and a leading consultant. He will be assisted

by Tom Countess of Temple & Son Electric Co., Inc., Decatur, Alabama.

Dr. Parsonson will be the principal lecturer in the other three workshops. He will be assisted by several traffic engineers well known in the Southeast such as Archie Burnham, Bruce Friedman, Harold Raynor, Tom Stout and Joe Thomas.

CONTINUING EDUCATION UNITS TO BE AWARDED FOR EACH OF THESE PROGRAMS: 3.2 for Workshop IV and 2.4 each for Workshop I, II and III

These programs will be assigned continuing education units as required by Standard Nine of the Southern Association of Colleges and Schools. A continuing education unit (CEU) is defined as ten contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction and qualified instruction.

The number of CEU's indicated above will be recorded in the name of each registrant who successfully completes a workshop. An official transcript of CEU's earned in Georgia Tech Programs can be obtained from the Registrar.

HOUSING, MEALS AND PARKING

Hotel and motel reservations should be made directly by the registrant. Full information on nearby hotels and motels will be included in registration acknowledgments. Meals are available at reasonable prices in campus dining facilities. Parking permits valid in a designated parking area will be issued to registrants who indicate they will drive a car to the campus.





the Department of  
Continuing Education of the  
**GEORGIA INSTITUTE  
OF TECHNOLOGY**  
announces a series of

**TRAFFIC  
SIGNAL  
WORKSHOPS**

tuition-free

again for

1974-1975

Conducted by the School of Civil Engineering  
under a training grant from the State Office of  
Highway Safety, which administers the  
Georgia Highway Safety Program  
through funds provided by the National Highway  
Traffic Safety Administration and the Federal  
Highway Administration.

INTRODUCTION TO TRAFFIC SIGNALIZATION WORKSHOP

October 7-10, 1974

-ROSTER-

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Sign and Signal Shop Foreman  
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ACADEMIC ADMINISTRATOR AND PRINCIPAL INSTRUCTOR  
Peter S. Parsonson, Ph.D., P.E.  
Associate Professor, School of Civil Engineering  
Georgia Institute of Technology

SENIOR INSTRUCTOR  
Joseph M. Thomas, Jr.  
City Traffic Associate Engineer  
City of Atlanta, Georgia

INSTRUCTOR  
Bruce E. Friedman  
Traffic Engineer  
JHK & Associates  
Atlanta, Georgia

# INTRODUCTION TO TRAFFIC SIGNALIZATION

October 7-10, 1974

## -COURSE SCHEDULE-

<u>Day</u>	<u>Hours</u>	<u>Topic</u>	<u>Notebook Section</u>
Monday, Oct. 7	1:00-1:15	Welcome, Orientation to Course	
	1:15-2:00	Introduction to Traffic Signals; Purposes and General Features	1
	2:00-2:55	Phases and Sequences	2
	3:05-3:30	Work Problem on Phases and Sequences	2
	3:30-3:55	Operation of Pretimed Controllers at Local Intersections	3
	4:05-5:00	Phase Sequencing of Pretimed Controllers	3
Tuesday, Oct. 8	8:00-8:30	Workshop Session on Cam Breakout	3
	8:30-8:55	Traffic Signal Systems: Advantages and General Characteristics - Bruce Friedman	4
	9:05-9:30	Coordination of Pretimed Controllers - Bruce Friedman	5
	9:30-10:25	Detector Hardware	6
	10:35-11:00	Detector Installation	
	11:00-12:00	Timing of Basic Actuated Controllers; Film	7
	12:00-1:00	Lunch	
	1:00-2:00	Multi-Phase Actuated Controllers; Film; Skip Phasing; Overlap Phasing	8
	2:00-3:00	Field Trip to Local Signalized Intersection	
	3:00-3:55	Special Interval Units; Split Phasing	9
	4:05-5:00	Slides on the 1970 MUTCD - Bruce Friedman	
Wednesday, Oct. 9	8:00-8:55	Signal Display and Placement - Joe Thomas	11
	9:05-9:55	Principles of Coordination of Semi-Actuated Controllers; Mutual Coordination	10

Introduction to Traffic Signalization  
October 7-10, 1974  
Course Schedule

Page Two

<u>Day</u>	<u>Hours</u>	<u>Topic</u>	<u>Notebook Section</u>
	10:05-10:55	Introduction to Traffic-Adjusted Systems of Semi-Actuated Controllers	10
	11:05-12:00	Intersection Layout and Installation Planning - Joe Thomas	12
	12:00-1:00	Lunch	
	1:00-2:00	Intersection Layout and Installation Planning (continued) - Joe Thomas	12
	2:00-3:00	Field Trip to Local Signalized Inter- section - Joe Thomas	
	3:00-3:55	Introduction to Troubleshooting and Bench Repair; Priorities, Procedures, Records - Joe Thomas	13
	4:05-5:00	Basic Electric Circuitry; Wiring Diagrams; Field Wiring; Test Equipment - Joe Thomas	13
Thurs., Oct. 10	8:00-8:55	Maintenance and Repair of Pretimed Controllers - Joe Thomas	13
	9:05-9:55	Circuitry of E/M Actuated Controllers - Joe Thomas	13
	10:05-10:55	Maintenance and Repair of E/M Actuated Controllers - Joe Thomas	13
	11:05-11:45	Introduction to Solid State Equipment - Joe Thomas	13
	11:45-12:00	Course Evaluation; Presentation of Certificates	

Georgia Institute of Technology  
Department of Continuing Education

GENERAL EVALUATION

(If there is insufficient space to answer any questions, please continue on back of page.)

1. Do you feel that the objective of this course was met: Yes 17 No 0

If yes, comment: \_\_\_\_\_

\_\_\_\_\_

If no, why? \_\_\_\_\_

\_\_\_\_\_

2. Supervision and planning of the course:

Excellent	Good	Fair	Poor
-----------	------	------	------

<u>13</u>	<u>4</u>	<u>0</u>	<u>0</u>
-----------	----------	----------	----------

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. Overall Instruction . . . . . Excellent Good Fair Poor

<u>13</u>	<u>4</u>	<u>0</u>	<u>0</u>
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Specific Instruction - Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Physical Facilities . . . . . Excellent Good Fair Poor

<u>11</u>	<u>6</u>	<u>0</u>	<u>0</u>
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Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. Was the material generally presented at the correct level for this group?

Yes 17 No 0

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Would you recommend that your organization send other people to a course of this kind in the future?

Yes 16 No 1

Comments: The one person indicating No was a guest from the FHWA Division Office. He stated that the FHWA has very little contact with signal equipment.

7. Overall value of the course to you. Please state in your own words.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. Suggestions for improvement of the course.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. Where did you first learn of this course?

Newspaper \_\_\_\_\_

Magazine, journal, etc. \_\_\_\_\_

Word of mouth \_\_\_\_\_

Brochure \_\_\_\_\_

Company Personnel Department \_\_\_\_\_

Other \_\_\_\_\_



TRAFFIC SIGNAL WORKSHOP II  
-Servicing of Electro-Mechanical Traffic-Signal Controllers-  
December 2-5, 1974

-ROSTER-

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Servicing of Electro-Mechanical  
Traffic-Signal Controllers  
December 2-5, 1974

Page 2

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Servicing of Electro-Mechanical  
Traffic-Signal Controllers  
December 2-5, 1974

Page 2

ADDENDUM:

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Dr. Peter S. Parsonson

Associate Professor, School of Civil Engineering

Georgia Institute of Technology

PRINCIPAL INSTRUCTOR

Mr. Richard McDonnell

Temple & Son Electric Company

Decatur, Alabama

INSTRUCTOR

Mr. Tom Countess

Temple & Son Electric Company

Decatur, Alabama

# SERVICING OF ELECTRO-MECHANICAL TRAFFIC-SIGNAL CONTROLLERS

December 2-5, 1974

## -SCHEDULE-

<u>Day</u>	<u>Hours</u>	<u>Topic</u>
Monday, December 2	Afternoon Instructor:	Mr. Richard McDonnell
	1:00- 1:15	Welcome; Orientation to Course
	1:15- 1:55	Review of Basic Electric Circuitry; Wiring Diagrams; Field Wiring; Test Equipment
	2:05- 2:55	Pretimed Controllers: Review of Operation
	3:05- 3:55	Pretimed Controllers: Field Troubleshooting
	4:05- 5:00	Pretimed Controllers: Preventive Maintenance Repairs in Field and Shop
Tuesday, December 3	Instructors:	Mr. Tom Countess, assisted by Mr. McDonnell
	8:00- 8:55	Actuated Controllers: Review of Operation of Two-Phase Equipment
	9:05- 9:30	Actuated Controllers: Functions of Camshaft and Step Switch
	9:30-10:25	Actuated Controllers: Timing Circuits, Breadboard Model
	10:35-12:00	Troubleshooting, Repair and Maintenance of Two-Phase Actuated Controllers
	12:00- 1:00	Lunch
	1:00- 2:00	Troubleshooting, Repair and Maintenance of Two-Phase Actuated Controllers (cont.)
	2:00- 3:00	Field Trip to Local Signalized Intersection
	3:00- 3:55	Multi-Phase Actuated Controllers: Operation and Circuitry
	4:05- 5:00	Multi-Phase Actuated Controllers: Troubleshooting, Maintenance and Repair
Wednesday, December 4	Morning Instructor:	Mr. Countess, assisted by Mr. McDonnell
	8:00- 8:55	Multi-Phase Actuated Controllers (cont.)

9:05- 9:55	Special Interval Units
10:05-10:30	Coordination Devices
10:30-10:55	Detectors
11:05-12:00	Installation Essentials: Grounding, Bonding, Lightning Protection
12:00- 1:00	Lunch
1:00- 2:00	Installation (cont.) - Mr. Countess
2:00- 3:00	Field Trip to Local Signalized Intersection
3:00- 4:30	Georgia Installation Specifications - Mr. McDonnell
4:30- 5:00	Field Equipment, Tools, Personnel
Instructor:	Mr. McDonnell
8:00- 8:30	Periodic Inspections, Field and Shop
8:30- 9:55	Emergency Procedures: Troubleshooting Priorities
10:05-11:00	Field Troubleshooting (cont.)
11:00-11:45	Recordkeeping
11:45-12:00	Course Evaluation; presentation of certificates

Thursday,  
December 5



CARLTON FISHER  
DIRECTOR  
OFFICE OF HIGHWAY SAFETY

TELEPHONE 656-3218  
AREA CODE 404

## Office of Highway Safety

7 HUNTER STREET, S. W.  
Atlanta, Georgia 30334

December 4, 1974

Dr. Peter S. Parsonson  
Associate Professor  
School of Civil Engineering  
Georgia Institute of Technology  
Atlanta, Georgia 30332

Re: Highway Safety Project No.  
613-75-004-001, Workshop II,  
"Servicing of Electro-Mechanical  
Traffic-Signal Controllers"

Dear Pete:

It was a pleasure visiting with you during the presentation of a session of the subject workshop.

I feel your guest lecturers Messrs. Countess and McDonnell are very capable, interesting and effective. The schedule arrangement, use of numerous teaching aids, relatively informal presentation and participation from the students, and field trips tend to keep the workshop moving quite effectively. The teacher-student communication, as a result, appears to be very good.

I feel I can conclude that the objectives of subject project are being effectively accomplished.

Sincerely,

Peter M. Palmer  
Civil Engineer II

PMP:bc

cc: Programs Division  
Finance Division

11

Georgia Institute of Technology  
Department of Continuing Education

GENERAL EVALUATION

(If there is insufficient space to answer any questions, please continue on back of page.)

1. Do you feel that the objective of this course was met: Yes 20 No 3

If yes, comment: \_\_\_\_\_

\_\_\_\_\_

If no, why? \_\_\_\_\_

\_\_\_\_\_

2. Supervision and planning of the course:

Excellent	Good	Fair	Poor
<u>10</u>	<u>11</u>	<u>2</u>	<u>    </u>

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Overall Instruction . . . . .	Excellent	Good	Fair	Poor
	<u>12</u>	<u>10</u>	<u>1</u>	<u>    </u>

Specific Instruction - Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Physical Facilities . . . . .	Excellent	Good	Fair	Poor
	<u>15</u>	<u>8</u>	<u>    </u>	<u>    </u>

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



5. Was the material generally presented at the correct level for this group?

Yes 21 No 3

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Would you recommend that your organization send other people to a course of this kind in the future?

Yes 22 No 1

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Overall value of the course to you. Please state in your own words.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. Suggestions for improvement of the course.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. Where did you first learn of this course?

Newspaper \_\_\_\_\_

Magazine, journal, etc. \_\_\_\_\_

Word of mouth \_\_\_\_\_

Brochure \_\_\_\_\_

Company Personnel Department \_\_\_\_\_

Other \_\_\_\_\_

TRAFFIC-SIGNAL WORKSHOP III  
TRAFFIC-SIGNAL OPERATION AT LOCAL INTERSECTIONS  
March 10-13, 1975

-ROSTER-

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# TRAFFIC-SIGNAL OPERATION AT LOCAL INTERSECTIONS

March 10-13, 1975

Principal Instructor: Peter S. Parsonson, Ph.D., P.E.

Guest Lecturer: Joe M. Thomas, Jr., City Traffic Associate Engineer, Atlanta, Georgia

## -SCHEDULE-

<u>Day</u>	<u>Hours</u>	<u>Topic</u>	<u>Notebook Section</u>
Monday	1:00-1:15	Welcome; Orientation to Course	-
	1:15-2:00	Review of First Workshop in Series	
	2:00-2:55	Timing of Pretimed Intervals	4
	3:05-3:30	Begin Work Problem on Pretimed Timing	18
	3:30-4:30	Phase Capacity	4
	4:30-5:00	Finish Work Problem	18
Tuesday	8:00-8:30	Work Problems on Phase Capacity	18
	8:00-8:30	Location of Small-Area Detectors for Basic Actuated Controllers - Guest Lecturer	7
	9:35-10:30	Fundamentals of Advanced Actuated Controllers and Their Detectors; Film -Guest Lecturer	8
	10:30-11:30	Field Exercise--Manual Volume Counts, Crossing Gap Measurement	17
	11:30-12:00	Advanced Actuated Controllers (cont)	8
	12:00-1:00	Lunch	
	1:00-2:00	Multiple-Point Small-Area Detection	8
	2:00-3:00	Workshop Session No. 1	19
	3:00-4:00	Loop-Occupancy Controllers and Their Large-Area Detectors; Loop Design	9
	4:00-5:00	Workshop Session No. 2	19

Wednesday	8:00-9:00	Signal Warrants and Priority Ratings - Guest Lecturer	13
	9:00-10:00	Workshop Session No. 3	19
	10:00-11:00	Case Studies; Specification Writing - Guest Lecturer	16
	11:00-12:00	Workshop Session No. 4	19
	12:00-1:00	Lunch	
	1:00-2:00	Workshop Session No. 5	19
	2:00-3:00	Advance Engineering Data Required	17
	3:00-4:00	Workshop Session No. 6	19
	4:00-5:00	Field Exercise--Measurement of Headways, Load Factors, Queue Discharge	17
Thursday	8:00-9:00	Field Exercise--Measurement of Vehicle Delay	17
	9:00-10:00	Workshop Session No. 7	19
	10:00-11:00	Economic Benefits of Local Intersection Improvements; Preemption Control	14,12
	11:00-11:45	Workshop Session No. 8	19
	11:45-12:00	Course Evaluation; Presentation of Certificates	-

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Georgia Institute of Technology  
Department of Continuing Education

GENERAL EVALUATION

(If there is insufficient space to answer any questions, please continue on back of page.)

1. Do you feel that the objective of this course was met: Yes 17 No 1

If yes, comment: \_\_\_\_\_  
\_\_\_\_\_

If no, why? \_\_\_\_\_  
\_\_\_\_\_

2. Supervision and planning of the course:

Excellent	Good	Fair	Poor
<u>13</u>	<u>5</u>	_____	_____

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Overall Instruction . . . . . Excellent      Good      Fair      Poor

<u>12</u>	<u>6</u>	_____	_____
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Specific Instruction - Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Physical Facilities . . . . . Excellent      Good      Fair      Poor

<u>16</u>	<u>2</u>	_____	_____
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Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Was the material generally presented at the correct level for this group?

Yes 18 No 0

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Would you recommend that your organization send other people to a course of this kind in the future?

Yes 18 No 0

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Overall value of the course to you. Please state in your own words.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. Suggestions for improvement of the course.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. Where did you first learn of this course?

Newspaper \_\_\_\_\_

Magazine, journal, etc. \_\_\_\_\_

Word of mouth \_\_\_\_\_

Brochure \_\_\_\_\_

Company Personnel Department \_\_\_\_\_

Other \_\_\_\_\_

Operation of Actuated Traffic Signals  
at Local Intersections

Part I - Basic Actuated Controllers

CIRCLE THE LETTER OF THE CORRECT ANSWER.

25  
correct

CLASS  
AVERAGE  
= 78%

1. This film deals with:
  - ☒ a) Small-area detectors only
  - ☐ b) Small-area detectors operated in the pulse mode only
  - ☐ c) Loop detectors only
  - ☐ d) Motion detectors only
  - ☐ e) Presence detectors only
2. A basic actuated controller:
  - ☐ a) Counts all of the waiting cars
  - ☒ b) Counts only the first waiting car
  - ☐ c) Counts only the cars that arrive with a certain minimum speed
  - ☐ d) Counts only cars that arrive during green or yellow
  - ☐ e) Counts only the cars that arrive after relay closure
3. A locking detector memory circuit:
  - ☒ a) Locks a call into the controller's memory
  - ☐ b) Locks a call into the detector's memory
  - ☐ c) Is found only on electro-mechanical equipment
  - ☐ d) Is found only on solid-state equipment
  - ☐ e) Unlocks as soon as the vehicle leaves the detection area
4. The Minimum Assured Green is long enough to discharge:
  - ☐ a) All of the cars waiting
  - ☐ b) All of the cars actually waiting between detector and stop line
  - ☒ c) All of the cars possibly waiting between detector and stop line
  - ☐ d) A single car approaching at normal speed
  - ☐ e) A single car trapped between detector and stop line
5. The Greenshields formula  $t = 4 + 2n$ :
  - ☐ a) Applies primarily to truck traffic on upgrades
  - ☒ b) Is used to calculate the Minimum Assured Green
  - ☐ c) Is used to calculate the Vehicle Interval
  - ☐ d) Is used to calculate the Clearance Interval
  - ☐ e) Is used to calculate the Initial Interval
6. A basic actuated controller has a timing adjustment labeled:
  - ☐ a) Minimum Assured Green
  - ☐ b) Initial Interval + Vehicle Interval
  - ☐ c) Variable Initial Interval
  - ☒ d) Initial Interval
  - ☐ e) Minimum Initial Interval



7. The Vehicle Interval is:
- a) Set to be  $4 + 2n$
  - b) The start-up time for the first waiting vehicle
  - ☒ c) The passage time from detector to stop line
  - d) The average time between discharging vehicles
  - e) Normally set to be equal to the Initial Interval
8. For a 100-foot detector set-back the Minimum Assured Green is normally:
- a) 3 to 4 seconds
  - b) 6 seconds, assuming speeds under 30 mph
  - ☒ c) 14 seconds
  - d) 30 seconds, assuming a 60-second cycle
  - e) 50 to 60 seconds
9. The Minimum Assured Green is timed to be:
- a) Whatever that timing adjustment is set to
  - b) Half the cycle length
  - c) The Initial Interval
  - ☒ d) The Initial Interval plus one Vehicle Interval
  - e) The period until the detector memory relay unlocks
10. Cars that are waiting beyond the detector when the signal goes green will:
- a) Be trapped
  - b) Reset the Initial Interval
  - ☒ c) Reset the Vehicle Interval
  - d) Reset the Minimum Assured Green
  - e) Clear the intersection during the Maximum Interval
11. A full-actuated controller normally leaves the green:
- a) On the main street
  - b) On the cross street
  - c) On the street with the longer Minimum Assured Green
  - d) On the street with the longer Maximum Interval
  - ☒ e) On the street that last called for it
12. The Vehicle Interval is in effect:
- a) The start-up time of the first waiting vehicle
  - ☒ b) The allowable gap
  - c) The same as the Initial Interval
  - d) The sum of the Initial Interval and the Minimum Assured Green
  - e) The Maximum Interval minus the Minimum Assured Green
13. If the green is terminated by the Maximum Interval then:
- a) The yellow is extended to assure clearance
  - b) The Vehicle Interval is extended to assure clearance
  - ☒ c) The green is automatically returned at the earliest opportunity
  - d) The last vehicle is trapped unless there is a calling detector
  - e) The green is automatically returned at the end of the next Minimum Assured Green

14. If there is waiting traffic, and a Vehicle Interval times out, then the green will:

- a) "Max out"
- ☒ b) "Gap out"
- c) "Cop out"
- d) Rest or dwell on that street
- e) Return to the street with the green at the earliest opportunity

15. A normal Vehicle Interval setting is:

- a) 1 second
- ☒ b) 3 to 4 seconds
- c) 6 to 8 seconds
- d) 14 seconds
- e) 50 to 60 seconds

16. The Maximum Interval of a full-actuated controller begins to time:

- a) At the start of green
- b) At the end of the Minimum Assured Green
- c) Upon gap-out
- d) At the earliest opportunity
- ☒ e) Upon arrival of a waiting vehicle

17. If the approach speed is 30 mph, detectors for a full-actuated controller should be placed:

- a) 3 to 4 seconds of travel time back from the stop line
- b) At the stop line
- c) 10 seconds of travel time back from the stop line
- ☒ d) 120 feet back from the stop line
- e) 160 feet back from the stop line

18. If the approach speed is 45 mph:

- a) A basic actuated controller is usually desirable
- ☒ b) An advanced actuated controller is usually desirable
- c) There is no need to count waiting vehicles
- d) The Initial Interval must not be variable
- e) The detectors should be placed close to the stop line

19. Semi-actuated controllers have detectors:

- a) On all approaches to the intersection
- b) On the main street only
- ☒ c) On the side street only
- d) At the stop line of the side street only
- e) At the stop line of the main street only

20. A semi-actuated controller will cause the green to rest or dwell:

- ☒ a) On the main street
- b) On the side street
- c) On the street with the longer Minimum Assured Green
- d) On the street with the longer Maximum Interval
- e) On the street that last called for it

21. A semi-actuated controller:
- a) Allows the main street to extend its green to the Maximum Interval
  - b) Times the main street green as the Initial Interval plus one Vehicle Interval
  - ☒ c) Receives no information on main street demand
  - d) Is appropriate if side street traffic is heavy
  - e) Is appropriate if main street and side street volumes are about equal
22. The detectors for a semi-actuated controller:
- a) Are located the same as for a full-actuated controller
  - b) Are set back more than those for a full-actuated controller
  - ☒ c) Are set back less than those for a full-actuated controller
  - d) Are located at the stop line
  - e) Must be motion detectors operating in the pulse mode
23. A controller's recall switch should be used to:
- ☒ a) Keep traffic moving in the event of a detector failure
  - b) Make it unnecessary to repair a failed detector
  - c) Convert a semi-actuated controller into a full-actuated one
  - d) Change a Minimum Artery Green into a Minimum Assured Green
  - e) Make it unnecessary to install a calling detector
24. The WALK interval in a pedestrian-actuated phase:
- a) Is long enough for the pedestrian to walk from curb to curb
  - b) Is long enough for the pedestrian to walk to the center of the farthest traveled lane
  - c) Is long enough for the pedestrian to clear any vehicles that may be turning across his path during that phase
  - ☒ d) Is long enough for the pedestrian to see the WALK signal and react to it by taking the first step off the curb.
  - e) Is long enough for the pedestrian to cross the street, plus 7 seconds for perception-reaction time.
25. The flashing DON'T WALK interval in a pedestrian-actuated phase:
- a) Warns the pedestrian that he must return to the curb from which he came
  - ☒ b) Warns pedestrians on the curb against starting to cross
  - c) Is displayed only during the yellow vehicle change interval for that phase
  - d) Is displayed only during the vehicle interval that follows the initial interval
  - e) Is optional at the discretion of the traffic engineer

Operation of Actuated Traffic Signals  
at Local Intersections

Part II - Advanced Actuated Controllers

CLASS  
AVERAGE  
= 66%

CIRCLE THE LETTER OF BEST ANSWER

1. An advanced actuated controller, as compared to a basic one:
  - a) Is better able to measure the demand of waiting traffic
  - b) Can have its detectors set back a greater distance
  - c) Is more responsive to high-speed traffic
  - d) Is more responsive to high-volume traffic because it is better able to spot gaps in moving traffic
  - ☒ e) Has all of the advantages listed above
2. An advanced actuated controller:
  - ☒ a) Counts all of the cars waiting between detector and stop line
  - b) Counts only the first waiting car
  - c) Counts only the cars that arrive with a certain minimum speed
  - d) Counts only cars that arrive on Phase A
  - e) Counts only the cars that arrive on Phase B
3. An advanced controller times:
  - a) A fixed Initial Interval
  - ☒ b) A variable Initial Interval
  - c) No Initial Interval at all
  - d) An Initial Interval equal to Last Car Passage
  - e) An Initial Interval dependent upon the rate of gap reduction
4. An advanced controller times a Passage Time that is:
  - ☒ a) Constant from cycle to cycle
  - b) Variable from cycle to cycle
  - c) Dependent on the number of cars waiting
  - d) Fixed by the speed of the first car waiting
  - e) In effect the allowable gap
5. Variable Initial Interval is especially desirable:
  - a) For up-grade approaches with heavy truck traffic
  - b) At multi-legged intersections
  - c) If pedestrian timing is omitted
  - d) For low-speed approaches
  - ☒ e) For high-speed approaches

6. Variable Initial Interval helps to keep greens short:
- a) During periods of heavy traffic
  - ☒ b) During periods of light traffic
  - c) At approaches with short detector set-backs
  - d) In the absence of a calling detector
  - e) When that phase has to be placed on Recall to Maximum
7. The setting of the Maximum Initial Interval:
- a) Depends on the approach speed
  - b) Depends on the passage time
  - ☒ c) Depends on the detector set-back
  - d) Is normally 70 to 90 seconds
  - e) Is a safety limit to the green when a gap does not appear
8. The ability of an advanced controller to time a variable Initial Interval:
- a) Removes the 30 mph limitation on approach speeds
  - b) Removes the 120-foot limitation on detector set-backs
  - ☒ c) Gives both of these benefits
  - d) Gives neither of these benefits
  - e) Gives the additional benefit of Last Car Passage
9. The "dilemma zone" at an intersection approach:
- a) Is avoided by installing a calling detector
  - ☒ b) Is associated with the yellow change interval
  - c) Is associated with speeds under 30 mph
  - d) Is avoided by the use of time-waiting gap reduction
  - e) Is usually indicated by painting the curbing yellow
10. The key to solving the dilemma-zone problem is to:
- ☒ a) Detect traffic before it enters the dilemma zone
  - b) Extend the yellow interval
  - c) Add an all-red clearance interval
  - d) Count the number of cars waiting
  - e) Post a lower speed limit
11. A detector set-back of at least 5 seconds of passage time:
- a) Will usually produce sluggish signal operation
  - b) Ensures an appropriate allowable gap
  - ☒ c) Helps to solve the dilemma-zone problem
  - d) Should be used only with basic actuated controllers
  - e) Falls close to the center of the dilemma-zone cloud
12. "Density controller" is a manufacturer's term for:
- a) A basic controller with "speed control" feature
  - b) Any advanced actuated controller
  - c) A controller with Last Car Passage
  - d) A controller with variable Initial Interval
  - ☒ e) A controller with separate timing adjustments for passage time and allowable gap



13. An advantage of a "density" controller is that it permits:
- a) A long Minimum Initial Interval
  - b) A long green and a short yellow
  - ☒ c) A long passage time and a short allowable gap
  - d) A short passage time and a long allowable gap
  - e) A short passage time and a short allowable gap
14. A detector placement of about 7 seconds of passage time:
- a) Will usually produce sluggish signal operation
  - ☒ b) Tends to minimize stops during light traffic conditions
  - c) Tends to cause rear-end collisions
  - d) Tends to cause right-angle collisions
  - e) Ensures an appropriate allowable gap
15. Most "density" controllers reduce the allowable gap in proportion to:
- a) The approach speed (inversely)
  - b) The distance the detector is set back
  - ☒ c) The length of time waiting on the red
  - d) The time since the start of the green
  - e) The ratio of Initial Interval to Passage Time
16. The fact that the allowable gap cannot begin to decrease until the end of the variable Initial Interval:
- a) Is of little importance in actual practice
  - ☒ b) Is an incentive to keep the Minimum Initial Interval short
  - c) Is an incentive to keep the Minimum Initial Interval long
  - d) Means that the Minimum Allowable Gap should be held to no less than 5 to 7 seconds
  - e) Is the main argument in favor of Last Car Passage
17. As the allowable gap decreases during the green:
- a) The controller is simultaneously reducing the passage time from the detector to the stop line
  - b) The controller is simultaneously increasing the passage time
  - ☒ c) Moving traffic must meet a rising standard of flow efficiency in order to hold the green
  - d) Moving traffic must meet a falling standard of flow efficiency in order to hold the green
  - ☒ e) The time headway between vehicles must decrease in order for the green to hold
18. Upon gap-out the Last Car Passage feature:
- a) Changes the signal to yellow
  - b) Extends the yellow to one Passage Time in length
  - c) Affects intersection capacity rather than safety
  - d) Gives the car waiting just beyond the detector enough additional green time to avoid being trapped
  - ☒ e) Gives the car that most recently crossed the detector a safe passage through the dilemma zone.

19. The Maximum Interval of a "density" controller should:

- a) Normally be set at 30 seconds
- b) Be set low enough so that it usually expires before there is a gap-out
- ☒ c) Be set high enough so that it seldom expires before there is a gap-out
- d) Normally be set slightly higher than the Maximum Initial Interval
- e) Normally be set just equal to the time to reduce the allowable gap, plus one Last Car Passage time

20. Some advanced controllers are able to reduce the allowable gap on the basis of:

- a) The length of time waiting on the red
- b) The number of vehicles waiting on the red
- c) The density of the moving traffic
- ☒ d) All of the above
- e) None of the above

TRAFFIC SIGNAL WORKSHOP IV  
TRAFFIC-SIGNAL OPERATION IN COORDINATED SYSTEMS  
May 26-30, 1975

-ROSTER-

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DIRECTOR

## Office of Highway Safety

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TELEPHONE 656-3219  
AREA CODE 404

May 30, 1975

Dr. Peter S. Parsonson  
Associate Professor  
School of Civil Engineering  
Georgia Institute of Technology  
Atlanta, Georgia 30332

Re: Highway Safety Project No.  
613-75-004-001, Workshop IV,  
"Traffic Signal Operation in  
Coordinated Systems", May  
26 - 30, 1975

Dear Pete:

The visit of May 28, 1975 during a session of the subject workshop was a pleasure.

As has been the case in previous Workshops in the series, I was impressed by the numerous simulated signal configurations found in the Workshop. The manner of presentation and the opportunity afforded each participant for direct hands on familiarity with the various types of equipment is also very good.

It is felt that the series of four (4) Signal Workshops funded under the subject project have been a success. Of course, a follow-up evaluation will be conducted in the near future by contacting participants who have completed all or any of the Workshops.

If I can be of further assistance, please advise.

Sincerely,

Peter M. Palmer  
Highway Safety Planner

PMP:bc

TRAFFIC-SIGNAL OPERATION IN COORDINATED SYSTEMS

May 26-30, 1975

-FACULTY ROSTER-

Academic Administrator and Principal Instructor  
Peter S. Parsonson, Ph.D., P.E.  
Associate Professor, School of Civil Engineering

Instructors

In Order of Their Appearance

Bruce E. Friedman  
Traffic Engineer, JHK & Associates, Atlanta

Joseph M. Thomas, Jr.  
City Traffic Associate Engineer, Atlanta

George M. Slaughter, Ph.D., P.E.  
Associate Professor, School of Civil  
Engineering

Harold M. Raynor, Jr.  
Associate, Traffic Planning Associates, Atlanta

Tom L. Stout  
Regional Engineer, JHK & Associates, Atlanta

# TRAFFIC SIGNAL OPERATION IN COORDINATED SYSTEMS

May 26-30, 1975

## -COURSE SCHEDULE-

<u>DAY</u>	<u>HOURS</u>	<u>TOPIC</u>	<u>NOTEBOOK SECTION</u>
<u>Monday</u>			
	1:00-1:15	Welcome; Orientation to Workshop IV	--
	1:15-1:30	Traffic Signal Systems: Advantages and General Characteristics	1
	1:30-1:55	Warrants and Design Data Requirements	1
	2:05-3:30	Fundamentals of Time-Space Diagrams	2
	3:30-3:55	Work Problem on Time-Space Diagrams Favoring One Direction of Flow	17
	4:05-4:30	Progression in Balanced-Flow Systems with Equal Speeds and Uniform Block Lengths	2
	4:30-5:00	Work Problem on Simultaneous and Alternate Systems	17

<u>DAY</u>	<u>HOURS</u>	<u>TOPIC</u>	<u>NOTEBOOK SECTION</u>
Tuesday			
	8:00-8:30	Progression in Balanced-Flow Systems with Non-Uniform Block Lengths	2
	8:30-8:55	Work Problem on Modified Kell Method	17
	9:05-9:30	Coordination of Pretimed Controllers	3
	9:30-9:55	Work Problem on Determination of Pre- timed Offsets from Time-Space Diagrams	17
	10:05-10:55	Principles of Coordination of Actuated Controllers	4
	11:05-11:30	Synchrolizers and Their Coordination	4
	11:30-12:00	Work Problem on Determination of Synchrolizer Offsets from Time-Space Diagrams	17
	12:00-1:00	Lunch	
	1:00-1:55	Traffic-Adjusted Master Controllers Using Volume as the Only Parameter	5
	2:05-2:30	Work Problem on the TM-1 Master Controller	17
	2:30-2:55	Local Coordination Units and Semi- Actuated Controllers	5
	3:05-3:30	Local Coordination Units and Semi- Actuated Controllers, continued	5
	3:30-3:55	Work Problem on Traffic-Adjusted Systems of Semi-Actuated Controllers	17
	3:55-5:00	Field Trip to a City of Atlanta TM-200 System	--

<u>DAY</u>	<u>HOURS</u>	<u>TOPIC</u>	<u>NOTEBOOK SECTION</u>
<u>Wednesday</u>			
	8:00-8:30	Coordination of Full-Actuated Controllers	6
	8:30-9:25	Computer Aids to Time-Space Calculations	7
	9:35-10:00	Optically Limiting Signals	8
	10:00-11:00	Workshop Session No. 1	18
	11:00-12:00	Calculations for Network Coordination	9
	12:00-1:00	Lunch	
	1:00-1:55	Traffic Parameters for Advanced Systems	10
	2:05-2:55	Workshop Session No. 2	18
	3:05-3:55	Communication System Technology	15
	4:05-5:00	Workshop Session No. 3	18
<u>Thursday</u>			
	8:00-8:55	Fundamentals of Digital Computers	13
	9:05-9:55	Workshop Session No. 4	18
	10:05-10:55	Applications of Digital Computers to Traffic Surveillance and Control	14
	11:05-12:00	Field Trip to the City of Atlanta's Digital Computer for Traffic Control and Surveillance	14
	12:00-1:00	Lunch	
	1:00-1:55	Before and After Studies of Stops and Delays and Their Costs	12
	2:05-2:55	Workshop Session No. 5	18
	2:55-4:05	Computer Software for Traffic Control	13
	4:05-5:00	Workshop Session No. 6	18

<u>DAY</u>	<u>HOURS</u>	<u>TOPIC</u>	<u>NOTEBOOK SECTION</u>
<u>Friday</u>			
	8:00-8:55	Cost-Utility Analyses of Alternative Systems	16
	9:05-9:45	Workshop Session No. 7	18
	9:45-9:55	Film: "Computer in Paradise"--Eagle Signal	
	10:05-10:20	Alternative Methods for Computer Control of Pretimed and Actuated Controllers	14
	10:20-10:45	Workshop Session No. 8	18
	10:45-11:45	The VTCS/BPS Research Project in Washington, D. C.	14
	11:45-12:00	Course Evaluation and Closing	

Georgia Institute of Technology  
Department of Continuing Education

GENERAL EVALUATION

(If there is insufficient space to answer any questions, please continue on back of page.)

1. Do you feel that the objective of this course was met: Yes 17 No 0

If yes, comment: \_\_\_\_\_

If no, why? \_\_\_\_\_

2. Supervision and planning of the course:

Excellent	Good	Fair	Poor
<u>1</u>	<u>16</u>	_____	_____

Comments: \_\_\_\_\_

3. Overall Instruction . . . . . Excellent Good Fair Poor

<u>1</u>	<u>16</u>	_____	_____
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Specific Instruction - Comments: \_\_\_\_\_

4. Physical Facilities . . . . . Excellent Good Fair Poor

<u>9</u>	<u>8</u>	_____	_____
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Comments: \_\_\_\_\_



5. Was the material generally presented at the correct level for this group?

Yes 17 No 0

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Would you recommend that your organization send other people to a course of this kind in the future?

Yes 16 No 1

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Overall value of the course to you. Please state in your own words.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. Suggestions for improvement of the course.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. Where did you first learn of this course?

Newspaper \_\_\_\_\_

Magazine, journal, etc. \_\_\_\_\_

Word of mouth \_\_\_\_\_

Brochure \_\_\_\_\_

Company Personnel Department \_\_\_\_\_

Other \_\_\_\_\_